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Jain et al.

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(54) **COMPUTATIONALLY EFFICIENT
MODELING AND SIMULATION OF LARGE
SCALE SYSTEMS**

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Related U.S. Application Data

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(51) **Int. Cl.**
G06F 17/50 (2006.01)

(52) **U.S. Cl.** **716/115; 716/106; 716/111; 703/2; 703/14**

(58) **Field of Classification Search** **716/106, 716/111, 115; 703/2, 14**
See application file for complete search history.

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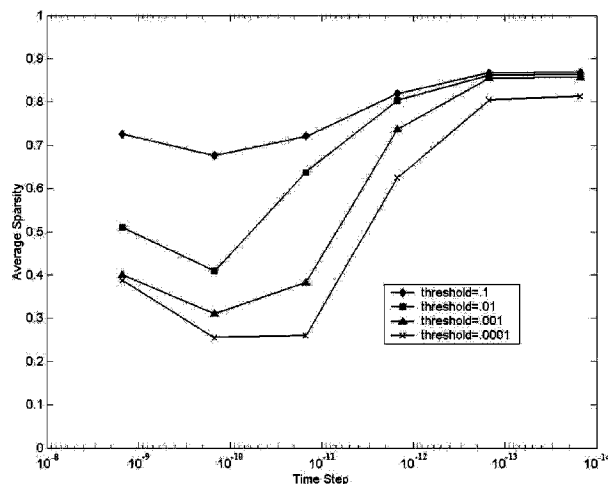
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(57) **ABSTRACT**

A method of simulating operation of a VLSI interconnect structure having capacitive and inductive coupling between nodes thereof. A matrix X and a matrix Y containing different combinations of passive circuit element values for the interconnect structure are obtained where the element values for each matrix include inductance L and inverse capacitance P. An adjacency matrix A associated with the interconnect structure is obtained. Numerical integration is used to solve first and second equations, each including as a factor the product of the inverse matrix X^{-1} and at least one other matrix, with first equation including $X^{-1}Y$, $X^{-1}A$, and $X^{-1}P$, and the second equation including $X^{-1}A$ and $X^{-1}P$.

9 Claims, 17 Drawing Sheets



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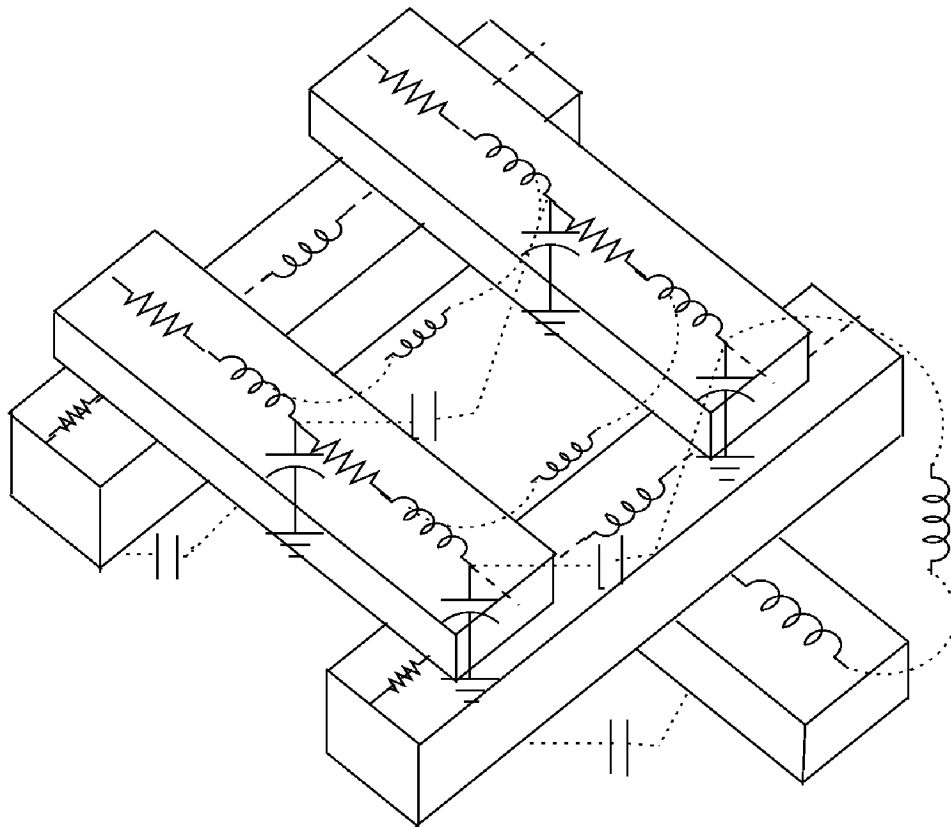


FIG. 1

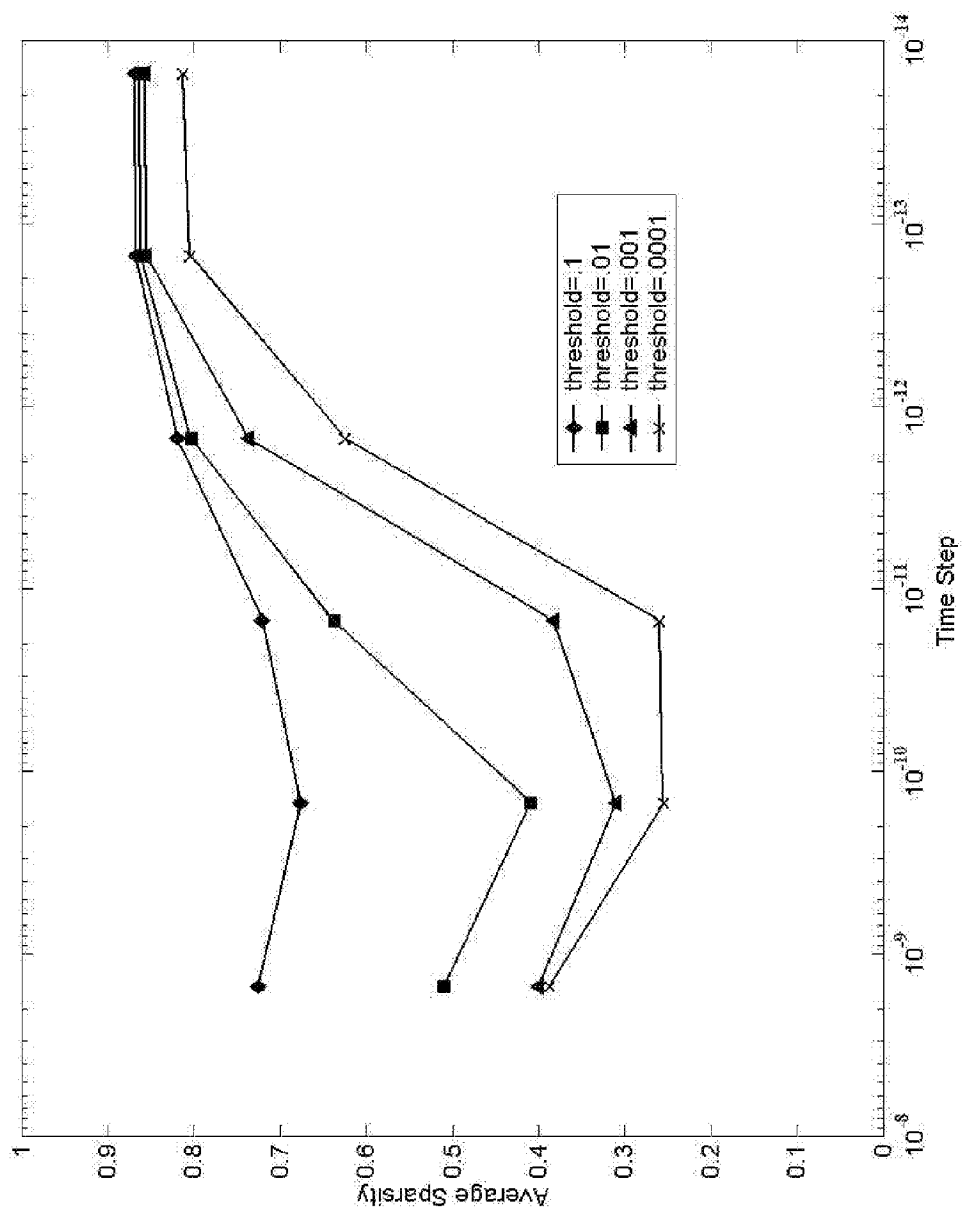


FIG. 2

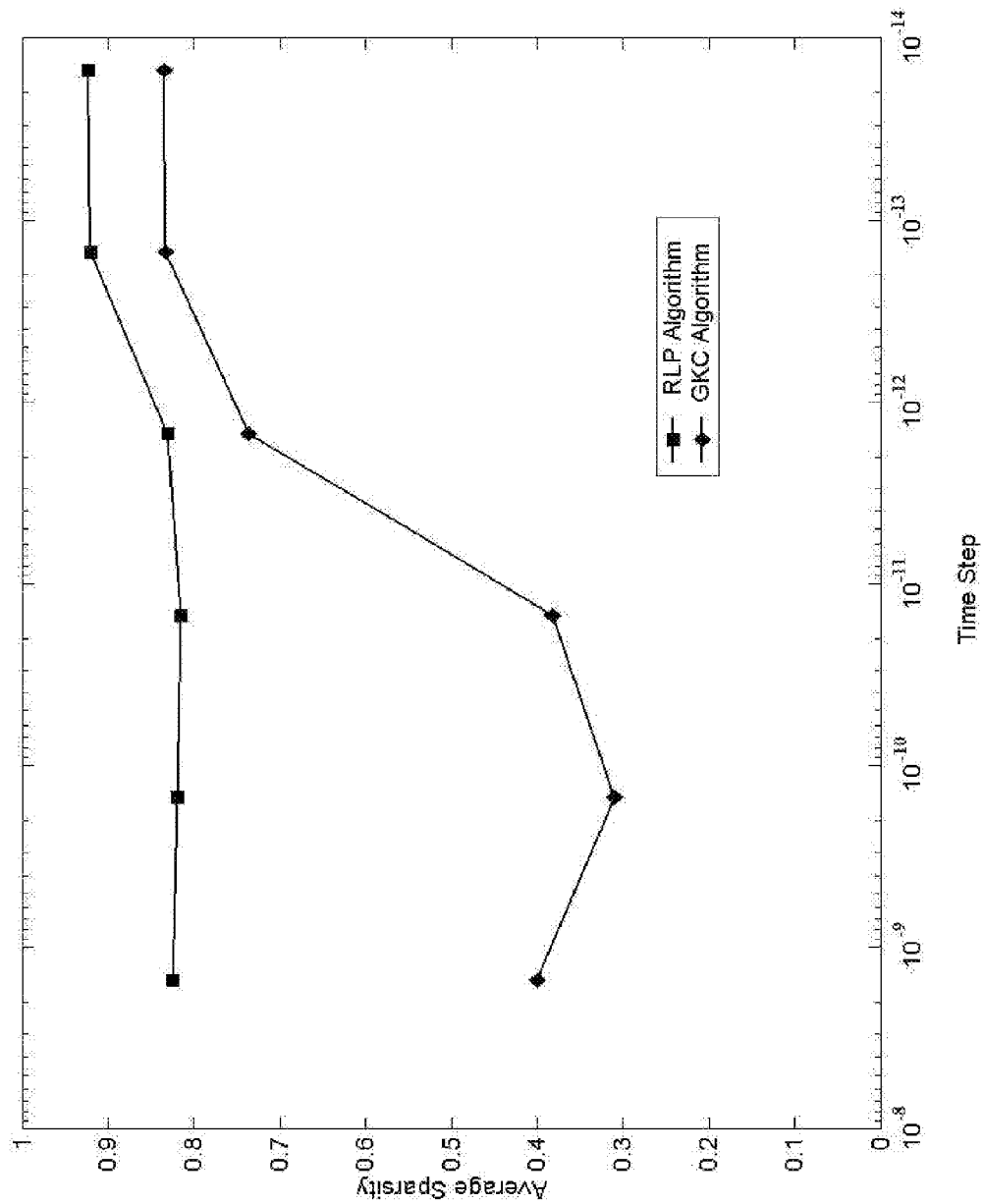


FIG. 3

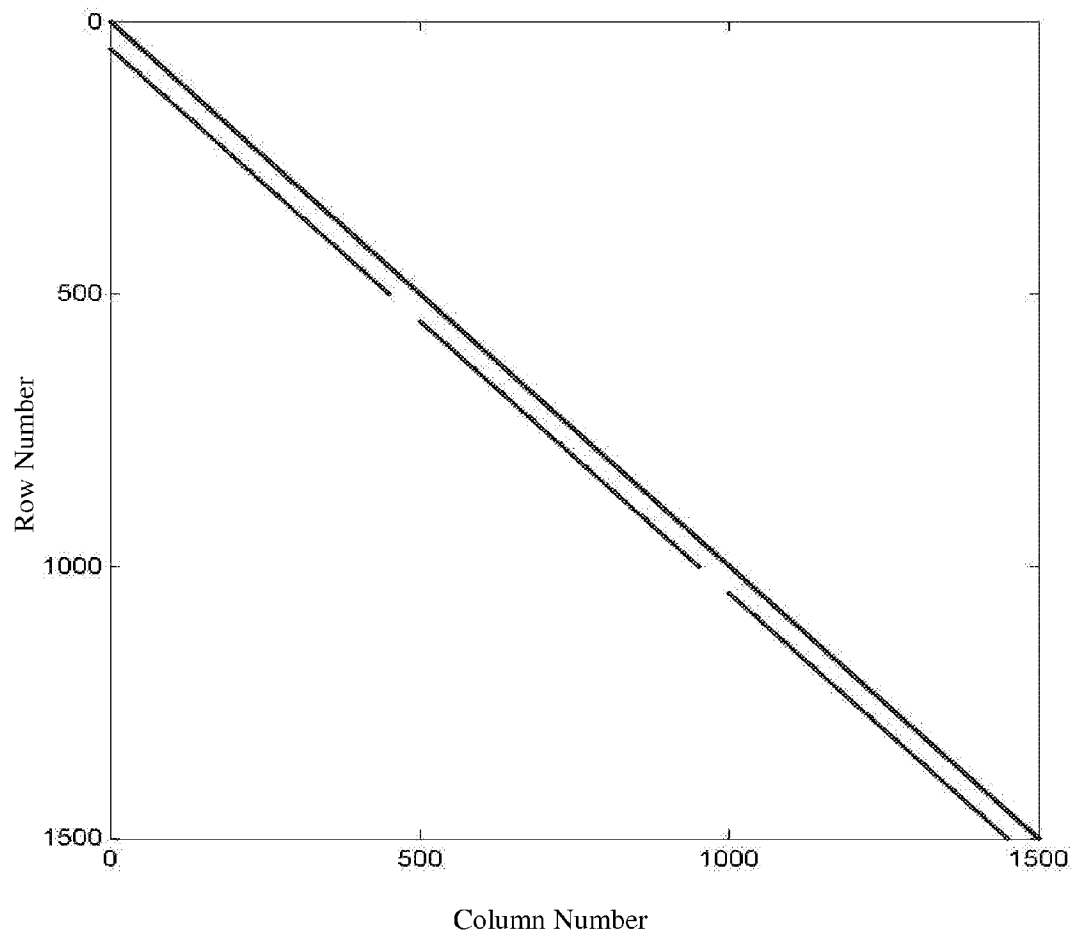


FIG. 4(a)

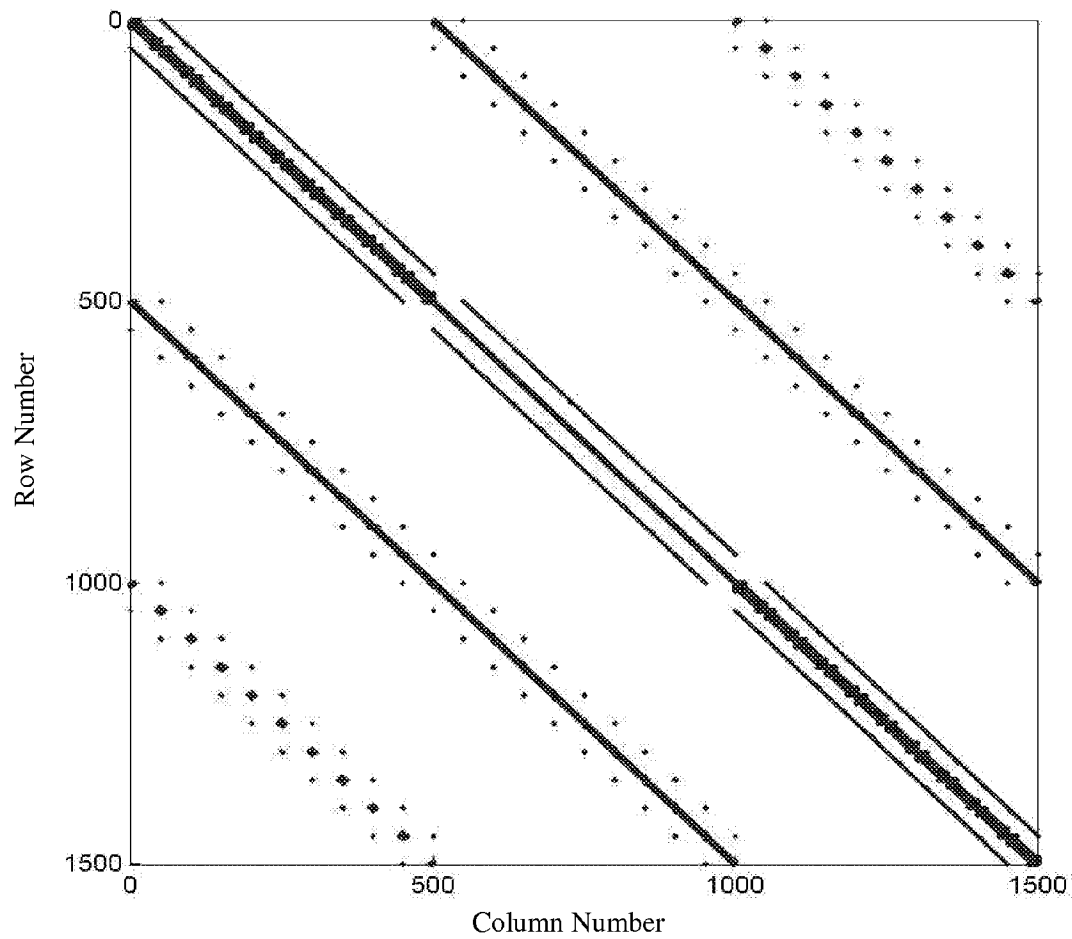


FIG. 4(b)

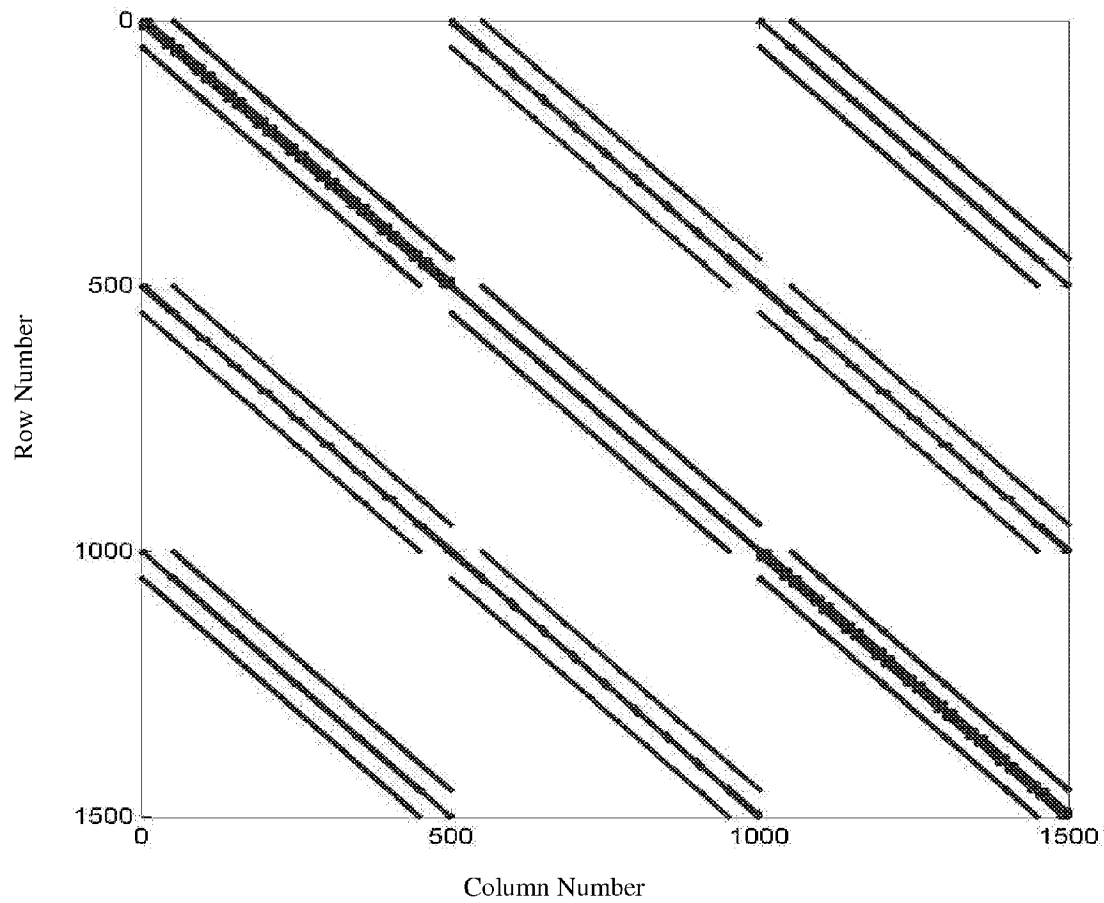


FIG. 4(c)